THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

Why is spring "prime time" for heavy precipitation events?

by Bruce Boe

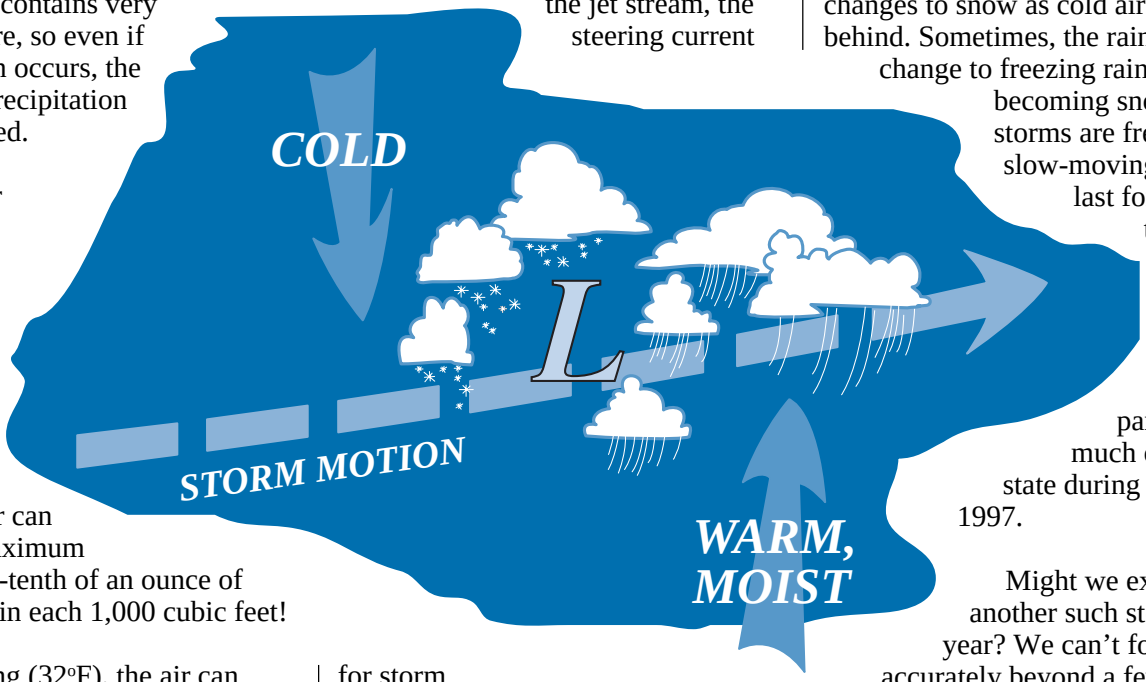
The amount of water vapor that air can contain is directly related to the temperature of the air. We've all heard the familiar phrase, "It's too cold to snow." When air is very cold, it contains very little moisture, so even if condensation occurs, the amount of precipitation is very limited.

As the air becomes warmer, however, its capacity to hold moisture increases. For example, at -20°F, the air can contain a maximum of about one-tenth of an ounce of water vapor in each 1,000 cubic feet!

At freezing (32°F), the air can contain ten times as much, about one ounce per 1,000 cubic feet. At 40°F, the air can contain over 2 ounces within each 1,000 cubic feet. So we see, the air's capacity for moisture increases dramatically as it warms.

During the months of December, January, and February, air temperatures are typically very cold, with overnight minimums often being below zero. These cold temperatures limit the available moisture. . .so when we get snow, it is usually fairly light.

Come spring, this begins to change. Surface temperatures warm, often reaching the thirties and low forties. Moisture capacity increases dramatically. Coupled with the initial poleward retreat of the coldest air is the repositioning of the jet stream, the steering current for storm systems, and the stage is ready.



Low pressure centers form in the lee of the Rocky Mountains, and deepen as they track eastward out into the plains. As these spring storms move from west to east, the winds around them blow in a counterclockwise direction. This means that in advance of the storm, winds are southerly, and pull up even warmer, more moist air from the Gulf of Mexico- our primary source of low level moisture any time of year. Behind the storm, winds are also counterclockwise, so cold air is pulled down from the north!

The result is an energetic storm with plenty of moisture and plenty of cold air. Often, precipitation begins as rain as the storm approaches, and changes to snow as cold air fills in behind. Sometimes, the rain may change to freezing rain before becoming snow! Such storms are frequently slow-moving, and so last for one or two days or more. It was a storm such as this that paralyzed much of the state during April 1997.

Might we experience another such storm this year? We can't forecast accurately beyond a few days, so as this is being written, it is hard to say. But we do know that spring, particularly late March and April, are high risk times for major snowstorms! ■

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